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ABSTRACT

The use of intranets for training and disseminating information was examined through a review of the following: print periodicals; websites of the European Network for Learning with Multimedia the Access and two British newspapers; postings to the Intranet Journal discussion groups; a general Internet search; and discussions with several leading companies. It was discovered that a large proportion of individuals and organizations do not understand the difference between the Internet and intranets. Intranet-based training appeared more widespread in the United States than in the United Kingdom; however, both countries were still in the experimental stage of using intranets for training. Within the United Kingdom's further and higher education sectors, intranets were generally part of the mix of media for the overall learning experience for a particular subject. Compared with early attempts at computer-based training, existing examples of web-based training are generally of much lower quality. Studies have suggested that up to 70% of U.S. firms but only 6% of British firms are currently using intranets for training. It appears certain, however, that intranet-based training will become increasingly prevalent because of the need for just-in-time training, the ease of updating intranet-based training easily, and intranets' distinct cost advantage. (Contains 23 references.) (MN)

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RESEARCH INTO THE USE OF INTRANETS FOR TRAINING

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RESEARCH INTO THE USE OF INTRANETS FOR TRAINING

EXECUTIVE SUMMARY

Introduction

Research has been carried out using journals; magazines; World Wide Web; intranet discussion groups and contact with leading organisations, thought to be using intranets for training.

Findings

From this research it becomes apparent that a large proportion of persons and organisations do not know or understand the difference between the Internet and intranets. Even when searching the Internet using the word 'intranet', you still get information about the Internet.

From the hype it would seem that there is a greater take up of training using an intranet in the United States of America than in the United Kingdom and elsewhere. Research suggests that 70 per cent of large corporations in the USA are using intranets within their organisations. However, I have been unable to find any concrete proof to substantiate this figure, but they do appear to be leading in using intranets for provision of information.

If we accept that learning can take place from access to information, then some unstructured training could be taking place. Paul Clothier in an article 'Developing training on an intranet' emphasises the need to differentiate between information and instruction[1]. He says that instruction recognises that information needs to be communicated in such a way as to be relevant to the learner. Levi Strauss, with an information type intranet and E-mail discussion groups, consider that this is helping them to be a learning organisation[2].

It would certainly seem that, like the UK, the USA is still in the experimental stages as far as using intranets for training is concerned.

There is evidence that intranets are being used in the UK, within Further and Higher Education, for training/learning. However, in most instances it forms part of the mix of media for the overall learning experience for a particular subject. In the main it is used for tutor support, peer group support and assessment. The actual learning content is being provided in a variety of ways, both traditional and flexible. This may be downloaded from the centre rather than being used in real time. This is what is happening in some industry intranet situations.[3]

Examples of web-based training in existence in the USAhave been viewed as part of this research. What is apparent, from the two examples seen, is that the quality of the material is worse than the early attempts at computer-based training. There is far too much text, little or no interaction and poor screen design. The same learning could be achieved from paper-based material. The only feature that was better than the early computer-based material was the graphics, which were better by virtue of the advance in graphics technology.

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There are constraints as far as full multimedia over an intranet is concerned. These are to do with bandwidth and management of the network. Bandwidth is continuing to increase and software solutions to the management of the network are beginning to appear.

From a survey carried out by NOP for the Department of Trade and Industry, only six per cent of companies in the UK are using intranets[4]. No mention is made of the use of these for training but it is known that companies in the UK are using intranets for training of staff. However, according to OmniTech[5] nearly one-third of all organisations using computer-based training deliver using a web server.

Those known to be using intranets for training in the UK are:

- BBC
- BG plc[6]
- British Telecoms
- GE Capital
- Hewlett Packard
- ICL, Software Technologies[7]
- Mercury Communications
- National Air Traffic Services
- NETG
- P & O Cruises[8]
- Railway College of Technology[8]
- Royal Mail
- Scottish Power[9]
- Stat Oil
- Tandem Computers[7]
- Unilever[9], and
- Most Oil Companies

Some of these organisations are in the early and experimental stages of implementing training via an intranet.

Conclusion

There is little doubt that training via an intranet will happen, for some organisations are already using this methodology. The forces that appear to be driving this are:

- the need for just-in-time training
- the ability to update the training easily
- the distinct cost advantage, and
- Health & Safety training.

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RESEARCH INTO THE USE OF INTRANETS FOR TRAINING

Introduction

Research was carried out into the usage of intranets for training and for information.

This research has been carried out in a number of ways:

- Paper-based search of magazines and journals.
- Access, as a member, to LearnTel's (The European Network for Learning with Multimedia Telematics) web site.
- Search of The Times and Telegraph newspapers on the Internet.
- Posting questions on the Intranet Journal discussion groups.
- General search of the Internet.
- Discussions with a number of leading companies.

Research

Paper-based search.

The following journals were searched for articles relating to intranets in general:

- AV Magazine
- Bulletpoint
- Business Computer World
- European Focus
- European Sources & News
- Director (Journal of the Institute of Directors)
- Information Management and Computer Security
- Inside Multimedia
- Interactive Media International
- IT Training
- Learning in a Global Information Society
- Management Skills & Development
- Multimedia Business Analyst
- People Management
- t Magazine
- Training and Development
- Training Information News Service
- Training Officer
- Training Tomorrow
- Training Technology & Human Resources
- Workforce

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Many of the articles found dealt with the Internet rather than intranets. Where they dealt with intranets they spoke mostly of the ability to have up-to-date information available to all employees. While it is accepted that the employees learn from accessing information, it is not training over the intranet and is certainly not structured. Paul Clothier[1] in an article 'Developing training on an intranet' emphasises the need to differentiate between information and instruction. He says that instruction recognises that information needs to be communicated in such a way as to be relevant to the learner.

Levi Strauss[2] regard themselves as a learning organisation and state "... employees have access to a wide variety of information. ... employees learn from one another and they work smarter, with ever increasing capacity to respond to their environment."

Similarly, Gary Lynch,[10] sees the intranet as being ideal for information retrieval and lists many applications, but does not mention training.

In support of the view that learning can be achieved using information systems, Dr R Grant Tate[11] says 'A close analysis of traditional company training programs shows that most training time is spent in information transfer rather than skill development.'

Two European organisations are using intranets for Video on Demand (VoD), Mercedes Benz and Reuters[12] These are examples of applications that will drive the implementation of new multimedia networks as:

- live news feeds to the desktop
- co-operative working and consultation
- visualisation and virtual reality
- access to video or audio multicasts from the Internet or intranet
- on-line viewing of video-on-demand from a remote database
- video conferencing.

Ray Hammond[13] says that 'the impact of the intranet will be even greater than most people might imagine. When intranets are run over an organisation's existing network, the access speeds and capacities are much higher than those currently available over ordinary telephone lines. This means that intranets will be able to exploit the multimedia facilities of web protocols before the public Internet, and there will be an explosion in video conferencing, document exchange and real-time collaborative working.'

Vaughan Walker[14] says that 'The Internet and, in particular, the World Wide Web, is the ultimate world library and development systems. It offers great opportunities for providing cost-effective, individualised, desktop-delivered training and continuing professional development for all employees.'

'A corporate intranet ... provides fast access to corporate information and training materials which is immediately accessible by any employee anywhere in the world.'

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Access to LearnTel's web site, members only information.

This area had not been updated since November 1996 and the articles there were all education based and did not appear to be relevant.

Search of The Times and Telegraph newspapers on the Internet.

Most articles accessed were about software or the Internet and not relevant to this research. However, two articles were found from Interface, The Times special weekly supplement.

- One comments that 'While six in ten of the top companies have an intranet, only 10 per cent welcome the liberalisation of company data that it supports, according to research by management consultancy Smythe Dorward Lambert.' They also suggest that many organisations fear the openness of intranets and are putting in controls defeating one of the objects of intranets.

- The other article deals with a sophisticated interactive training simulation of the oil and gas exploration business, currently paper-based but due to be available over intranets or the Internet. BG plc is already an enthusiastic user of this product.

Posting questions on the Intranet Journal discussion groups.

I tried posting questions on the Intranet Journal discussion groups. This got three replies. The first told me about a conference he had attended. The second suggested a good web site to visit, but access was denied to me. The third gave me some useful web sites to contact, again there were some I could not access. The results of access to these web site are dealt with in the next section.

General search of the Internet.

The fact that even searches using the two words 'intranet' and 'training' produce vast numbers of references most of which have little or nothing to do with intranets and certainly nothing to do with training, make trying to find appropriate information very difficult. However, some interesting information has been gathered which suggests that two things are happening.

The first is that html is being used to provide linear training using screens of text with a few graphics. They are basically page turning exercises and take us back years. This leads one to surmise whether the USA are really ahead of this country in technology-based training, for no-one, who had been using good interactive multimedia, could want to put this sort of material on their intranet and call it training. It would seem that it is the technical people that are producing this training.

The second is that there are a lot of people and organisations out there talking about training via an intranet and few actually doing anything about it.

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It is surprising that no-one appears to have taken the opportunity to use software, now available, for managing the network and its routes, which can provide MPEG quality video, therefore, full multimedia.

Bill Monroe of Harris Corporation seems to epitomise the general feeling out there that learning will take place, as a result of people searching information, and that that is training over an intranet. In reply to a question about creating an interactive learning environment for on-line training he speaks of news groups as being a great place to exchange ideas and break out of the corporate vacuum, and on the question of EPSS he says that they have a variety of manuals on-line and these are heavily accessed.

In an article 'The dominance of the intranet' one of the reasons given for the growth of intranet is claimed to be that it is well suited to multimedia applications, yet there is no reference in the article to training.

Other articles of interest are:

The Intranet - A Corporate Revolution
Reinventing Learning on the Job
Web-based training courses @ LLNL
FAQ for Web-based Training

Discussions with a number of leading companies.

I spoke to BT; NCR; Mercury; Hewlett Packard; NETG; Transcend Technology and IBM, who were all very helpful and all confirmed they were using their intranet for training. None of the companies knew of or were prepared to tell me about any other companies that are using intranets for training. NETG confirmed that they have a number of customers who are using NETG's intranet versions of their courses, but would not part up with any names.

Other items of possible interest.

Other items that may be of interest are:

- 'Intranets: The evolution of a new management tool.' by Andrew Parker & Ray Attwood published by Financial Times £395.00.
- PC Week 15.7.96 - 'Case Study: How an engineering giant took charge of its intranets.'
- PC Week 1.9.96 'Case Study: Columbia Health Care.'

Organisations using intranets for training/information

There are many organisations using intranets for information, particularly in the United States. Some researchers estimated that by this year seventy per cent of large corporations in the USA would have intranets.

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The organisations known to have intranets for information are:

- Amdahl
- AT&T[13]
- BBC
- Booz-Allen & Hamilton
- Cadence Design Systems
- Columbia Heath Care
- DDB Europe
- Dominion Apple Corporation
- Eli Lilley[13]
- Federal Express[13]
- Ford [13&15]
- Glaxo Wellcome[15]
- Levi Strauss
- Lockheed Martin
- McDonnell Douglas[13]
- Mercedes Benz
- Mobil[13]
- Morgan Stanley[15]
- National Semiconductors
- Olivetti[13]
- Reuters
- Rover
- Sandia Labs[13]
- Silicon Graphics
- SmithKline Beecham
- Tyson Foods

It is apparent from the research that there are a number of companies looking at using their intranets for training, but few have got very far down the road. The companies that seem to be using the technology are:

- BP
- British Telecoms
- Deutsche Telekom
- GE Capital
- Mercury Communications
- NASA
- NETG
- Royal Mail
- Stat Oil
- Tyson Foods

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Organisations in the very early stages are:

- Hewlett Packard
- Lloyds TSB
- National Air Traffic Services
- Unisys
- Unilever
- Most Oil Companies

Lloyds TSB have proved that it is possible to move training to a web-based system with little re-purposing, which was something that had been worrying many people. They have also shown that it is difficult if not impossible to get an intranet set up just for training. It needs to ride on the back of another application.

Organisations providing courseware for Internet/intranet delivery

ADC (LearnKey)[16]	0181 429 2410
CBT Systems[16 & 17]	0181 283 1800
Cheltenham Computer Training	
Gartner Learning[16]	01784 487124
Global Knowledge Network[16]	0118 925 5551
Interskill (Datatrain)[16]	0161 491 1666
Interskill (SRA)[16]	0161 491 1666
Learning Tree[16]	01372 364600
NETG[16]	0181 994 4404
NIIT (HCL Europe)[16]	01494 539333
Oracle	0118 924 0000
Pathlore Software [17]	01442 232345
Peritas Multimedia	01753 868181
The Open College[18]	

Difficulties in implementing training over an intranet

The major constraints to using intranets for training lie in the bandwidth[9,19 & 20] and the management of that bandwidth. To have the quality of multimedia training we have come to expect from multimedia delivered from a CD-ROM, it is necessary to have a high bandwidth - MPEG video files are typically 1.5 Mb. Progressive Networks[21] have produced Real Audio and RealVideo playback software which delivers newscast quality streaming video over the Internet. However, the way that most networks are managed, the whole bandwidth is used and multiple messages are sent along the lines. This latter aspect causes MPEG video to be extremely jerky.

To overcome these problems organisations are trying various solutions:

- BT in conjunction with On-Demand Information plc provide text, still pictures and graphics from a server and hold all the data once only. However, you need a specific piece of hardware to receive this data. While it has the advantage of being managed by the supplier it does require the special hardware which does not make it a practical

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solution.

- Transcend Technology [8,9,22] are holding the volatile information on the server and have the less volatile audio, video and graphic images on a CD-ROM. This provides CD quality audio, video and graphics with the benefit of holding only one copy of the volatile data, which makes for easy, fast and cost effective updating of the training. (Tel: 0178 853 4702)

- NCR hold all the data, including audio, video and graphics, on the server. They design the courseware in such a manner that the user is occupied in some interaction or activity while the video is being downloaded to the remote PC and played from the hard disk or RAM. This gives the advantage of only needing to hold a single copy of the material, thereby removing the costs of duplication and distribution, yet provides a multimedia solution. (Contact John Newton NCR Education)

  For some training they also download entire courses to run from the PC avoiding the problems associated with running from the server. To do this they need to keep file sizes to a minimum and therefore use programming languages rather than high level authoring tools. Tencore produces small file sizes and is beginning to make a comeback.

- Starlight Networks Inc have produced software that manages the network enabling MPEG video to be played across an intranet. This works by reading the file header, recognising that it requires 1.5 Mb of the bandwidth to send this file and reserves that amount of bandwidth to send the file, while the rest of the traffic uses the remainder of the bandwidth. This allows MPEG video to be played at the right quality while allowing the rest of the network traffic to continue undisturbed.

  RSVP[12] (resource reservation protocol) similarly has the ability to enable multimedia applications to make bandwidth reservations through a network of routers.

Conclusions

There is still a lot of hype and hope out there but there is no real evidence that, the undoubted benefits of using the intranet for training, are being exploited on a large scale. These benefits are:

- no distribution costs
- easy updating[23]
- course always the latest version
- training available at the workstation
- true just-in-time training
- peer and tutor support available on-line

The bandwidth is available on a company intranet and the software solutions are available to manage the network, allowing full multimedia training over the intranet. Early work in a large number of companies indicates that benefit will be achieved from the installation of an intranet.

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Reference to articles mentioned in the text

1	Paul Clothier	Developing training on an Intranet	IT Training	May '97
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3		Just-in-time Training	IT Training	Feb '97
4	Tim Phillips	Talking of the Intranet	Director	Nov '97
5		Trainers turn to Net solutions	AV Magazine	Aug '97
6	Colin Steed	BG to use intranet for training	IT Training	Nov '97
7		Web-based training	Business Computer World	Apr '97
8	Charles Jennings	So far, yet so near	People Management	11/09/97
9	Bob Little	Web-enabled courseware	IT Training	Jul '97
10	Gary Lynch	Intranets - just another bandwagon?	t Magazine	Feb '97
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12	Oliver Cognet	Multimedia Networks	European Sources & News	Vol 1 No 3
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14	Vaughan Waller	Intranets: Training Opportunities	Training Officer	Sept '96
15		Introducing Intranets	Bulletpoints	Sept '96
16		Intranet-based training delivery - The state of play	IT Training	May '97
17		Easy Access	Management Skills & Development	Oct '97
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19	Paul Clothier	Browser-delivered training	IT Training	Apr '97
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